REMARKS

INTERVIEW SUMMARY

This paper responds to the Forms PTOL-85 and PTOL-413 dated April 21, 2011. Please find attached Summary of the Substance of the Interview.

DATE OF INTERVIEW: April 19, 2011

PARTICIPANTS: Examiner Rodney G. McDonald (Group 1795)

Sandra P. Thompson, PhD (Reg. No. 46,264)

TYPE OF INTERVIEW: Telephonic

EXHIBITS: None

CLAIMS DISCUSSED: Claim 67

PRIOR ART DISCUSSED: Lu et al. and Kardokus et al.

AGREEMENT WITH RESPECT TO THE CLAIMS WAS REACHED.

PROPOSED AMENDMENTS & RESOLUTION:

Dr. Thompson and the Examiner discussed the fact that Kardokus is a two-dimensional target and the targets claimed in the current application are three-dimensional. Dr. Thompson also pointed out to the Examiner that the specification states that formation techniques (e.g. high compression methods) used on two-dimensional targets to get fine grain sizes are not appropriate and were not used at the time the current application was filed for three-dimensional targets. Dr. Thompson suggested filing a declaration from Sue Strothers that may further elaborate on this point.

CLAIM REJECTIONS – 35 USC 102

Claims 67, 69 and 73-76 are rejected under 35 USC 102(e) as being anticipated by Michaluk (US Patent Publication 2002/0157736). The Applicant respectfully disagrees.

Claim 67 of the current application recites that the three-dimensional target comprises copper. Michaluk specifically defines and attempts to solve a problem inherent with tantalum and niobium targets. No other metals are mentioned. Therefore, claim 67 is novel over Michaluk. In addition, claims 69 and 73-76 are novel over Michaluk by virtue of their dependence on independent claim 67,.

CLAIM REJECTIONS – 35 USC 103

Claims 67, 69 and 73-76 are rejected under 35 USC 103(a) as being unpatentable over Lu et al. (US 6471831) in view of Michaluk (US Patent Publication 2002/0157736). The Applicant respectfully disagrees.

Claims 67, 70 and 72-76 are rejected under 35 USC 103(a) as being unpatentable over Lu et al. (US 6471831) in view of Kardokus et al (US 6113761) and Michaluk (US Patent Publication 2002/0157736). The Applicant respectfully disagrees.

Claim 68 is rejected under 35 USC 103(a) as being unpatentable over Lu in view of Kardokus et al (US 6113761) and Michaluk as applied to claims 67, 70 and 72-76, and further in view of Kulkarni (US 6283357). The Applicant respectfully disagrees.

Claim 69 is rejected under 35 USC 103(a) as being unpatentable over Lu in view of Kardokus et al (US 6113761) as applied to claims 67, 70 and 72-76, and further in view of Michaluk (WO 00/31310). The Applicant respectfully disagrees.

Claim 71 is rejected under 35 USC 103(a) as being unpatentable over Lu in view of Kardokus et al (US 6113761) and Michaluk as applied to claims 67, 70 and 72-76, and

further in view of Pavate et al. (US 6391163). The Applicant respectfully disagrees.

Claim 67 recites:

"A three-dimensional physical vapor deposition target, comprising:

a material comprising copper;

an average grain size of less than or equal to 250 microns within the material;

a shape, the shape including at least one cup having a first end and a second end in opposing relation to the first end; the first end having an opening extending therein; the cup having a hollow therein; the hollow extending from the opening in the first end toward the second end; the cup having an interior surface defining a periphery of the hollow and an exterior surface extending around the second end at rounded corners; and

a sputtering surface defined along the interior surface of the cup, wherein the target is three-dimensional and monolithic." (emphasis added)

The new cited art in this case is the Michaluk reference. The problem with the Examiner's use of this reference; however, is that the Examiner is broadening its meaning and using it in an effort to render the current claims unpatentable based on its teachings, in part.

The Michaluk reference is specific in its teachings from the point in the Background where it outlines the specific problem to the point in the Detailed Description where it attempts to solve that problem. First, Michaluk states in Paragraph [0002] "The present invention relates to tantalum and niobium metals and methods of forming products from tantalum and/or niobium...". Second, in Paragraph [0003], Michaluk defines the problem by stating that tantalum billets have an uneven grain structure that varies between the center and edge of the billet. The center of the billet has "a microstructure composed of broad bands of larger, elongated grains adjacent to regions of varying fine grain size or of

unrecrystallized material." The outer portion of commercial tantalum billets have a relatively fine and uniform structure. Niobium is included with tantalum by Michaluk, presumably, because the two share similar properties –so much so that they are difficult to distinguish from other another and are adjacent to one another on the periodic table. Third, Michaluk does not disclose that other metals in the group of transition metals would work for his methods, but instead remains very specific as to tantalum and niobium. Therefore, with respect to Michaluk's citation in combination with all of the references stated above, it should not and cannot be combined to show anything with respect to a copper target.

As mentioned in previous responses, the original specification discusses in paragraph 0006 why it is so difficult to fabricate complex three dimensional targets, such as the Applied Materials, Novellus and/or Honeywell three dimensional targets. The manufacture of these targets cannot be analogized to the manufacture of a two-dimensional target in any way. It is just not appropriate to consider the Kardokus reference as analogous art in this case, because of this very reason – it is difficult and not intuitive to manufacture a three-dimensional target. Methods utilized at the time of the filing date of the current application just were not the same as those methods being utilized to construct conventional three dimensional targets. One of the biggest issues was the inability to get the grain size of the materials in a three dimensional target down to the levels seen in two dimensional targets of the same materials. At the time this application was filed – there was no appreciation or understanding in the art as to how that could be done.

The original specification discusses the issue of the average grain size within the material (see paragraph 0013). Specifically:

> "The improvement in deposited film uniformity that can be achieved with materials having smaller grain sizes has led to a desire to incorporate small grain size materials into the sputtering targets. It is found that small grain size materials can be formed within two-dimensional sputtering targets simply by subjecting the target materials to high compression during formation of the materials. Since the two-dimensional targets are essentially

> flat, high-compression technology can be readily incorporated into the processes of forming two dimensional targets. In contrast, it has proven difficult to form three dimensional targets having small grain sizes therein. It would be particularly desired to form monolithic copper targets having the complex geometries of the Fig. 2 and Fig. 4 target shapes, while also having a small average grain size."

All of the claims of the current application contain the provision that the target comprises copper and that the average grain size is less than or equal to 250 microns within the material, by virtue of their dependency on independent claim 67.

The Examiner did not point to any portion of the Lu disclosure that states that the targets have a small grain size. In fact, the Examiner uses Kardokus to supposedly show how grain size modification is obvious; however, as has already been discussed and covered in the Declaration by Susan Strothers – the technology used to produce low grain sizes in two dimensional copper targets does not directly or intuitively translate to the formation of three-dimensional targets. Combining either or both of these references with Michaluk to arrive at a three-dimensional monolithic copper target isn't correct either – and frankly borders on hindsight reconstruction – because Michaluk is specific to the problems seen in tantalum and niobium billets. Therefore, it stands to reason that one would not read Lu and consider this application, alone or in combination with Kardokus and/or Michaluk, to produce the claims of the current application at the time this application was filed.

Kardokus does not cure the obvious deficiencies of Lu, specifically the issue of a three dimensional target, because Kardokus does not disclose a three-dimensional target, as is disclosed in the present application. The Examiner is invited to review the original specification – paragraph [0013], which discusses the inherent differences in Kardokus and the current application. Therefore, claim 67 is considered allowable, along with the related dependent claims, in view of Lu and/or Kardokus.

The Kulkarni reference discloses a clad hollow cathode magnetron sputter target that is made from a plate of sputter target material and a sheet of cladding material. Kulkarni specifically explains that the benefit of the Kulkarni disclosure is that it solves the problems inherent with monolithic targets, including cost and weight (see Abstract, among other sections). The present application, including the independent claims, covers targets that are produced from ingots and cast ingots that are ultimately formed into monolithic targets, which is exactly the opposite of Kulkarni. The Examiner clearly should not be citing this reference, because it teaches away from a monolithic target and as a matter of fact, spends a great deal of space discussing their inferiority.

Michaluk and Pavate do not cure the obvious deficiencies of Lu, Kardokus, alone or in combination with one another, because they do not teach, disclose or motivate one of ordinary skill in the art to produce a three-dimensional copper target that is both monolithic and comprises an average grain size of less than or equal to 250 microns within the material.

Therefore, claim 67 is considered allowable, along with the related dependent claims, in view of Lu, Michaluk Pavate and/or Kardokus. In addition, dependent claims 68-76 are allowable by virtue of their dependency on independent claim 67.

REQUEST FOR ALLOWANCE

Claims 67-76 are pending in this application and the Applicant respectfully requests that the Examiner reconsider all of the claims in light of the arguments presented and allow all current and pending claims.

Respectfully submitted,

Buchalter Nemer, A Professional Corp.

Dated: July 21, 2011 By:

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